

PHILIP MORRIS
U.S.A.
INTER-OFFICE CORRESPONDENCE
RICHMOND, VIRGINIA

*R Wiley
FYI
Do you have
any comments?*

To: Dr. W. F. Gannon
From: H. B. Merritt
Subject: Coal Strength Studies

Date: January 7, 1976

I. INTRODUCTION

I have reviewed the coal strength situation with regards to the test and to our understanding of the mechanisms involved. Below I have outlined in broad general terms a program in this area. I believe that it is essential that initial efforts should be aimed at improving and understanding our present testing procedure. Once an improved test is developed and the effect of the various test parameters are understood, work can then be effectively carried out to quantify the various cigarette construction parameters and blend components interaction.

II. DISCUSSION

A. Evaluation and Improvement of the Present Testing Procedure

Work on this program should first be centered around improvement of the present testing procedure and how the results are reported. The problems are best summed up by stating that the relative standard deviation of the present test procedure is $\pm 17\%$ at the two sigma level. That is, two test results must differ by 34% of their value before the values can be said to be different. This large relative standard deviation is obtained after testing 400 cigarettes (16 machine loads) and requires approximately one hour plus per test result.

As a start on a program to improve this test procedure, I suggest the following areas of investigation:

PM3000857726

1. Method of Reporting Data

The present data are reported as percent removal. Reporting the data as the number of actual puffs taken per coal removal or per millimeter burned should help. This would require development of a technique for recording the puff interval during which a coal was removed.

The test results should be reported and evaluated along with static burning time and puff count data. A fast burning cigarette (100% stem) could be expected to have a higher incidence of coal removal than a slow burning cigarette.

It may be possible to improve the interpretation of the test results using the technique developed by Lilly-Hartung for estimating the amount of tobacco consumed during a puff. This technique requires puff-by-puff profiles, pyrolysis data and tobacco density data. This type of treatment may allow estimation of the size-weight of the coal.

2. Improvement of Testing Procedure

Attempts to improve the testing procedure will require studies of the effect of the various machine parameters and cigarette parameters. Work in this area should be done using rods (no filter) of uniform length and density (weight selected). The present procedure has indicated that the percent removal is affected by the type of filter used. This confusion should be removed.

The cigarettes are puffed from a common plenum. This feature of the present machine may not insure a uniform 35 cc puff as the test proceeds due to the fact that the cigarettes from which the coal is removed are left in the machine. It should be expected that increased puff volume would enhance the probability of coal removal and conversely. Again, it has been shown that the density of the rod affects test results. Weight selection of the test cigarettes should help here.

January 7, 1976

B. Evaluation of Cigarette Physical Parameters

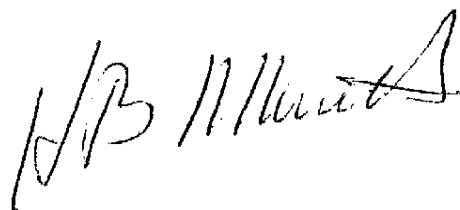
With an improved testing procedure, work should turn to the evaluation of the effect of the following cigarette construction parameters using a standard blend.

1. Weight
2. Circumference
3. Paper (porosity - burn additives)
4. Seam (location - width)
5. Internal glue exposure to tobacco
6. Length, etc.

The test results obtained should be evaluated along with the smoking data listed above.

C. Evaluation of Blend and Casing Parameters

With the development of an improved test procedure and a firm understanding of the effect of cigarette construction parameters, work to evaluate the various blend components and their interaction in blends can be initiated.



HBM:gmm

cc: Mr. J. E. Wickham
Mr. E. L. Watts
Mr. C. A. Lilly
Mr. H. A. Hartung

PM3000857728